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Inventor(s): Farnworth t al.

contact. In particular, the invention is useful for establishing electrical contact with semiconductor dies. --

In the Abstract:

N.E. Not in line Line 6 of the paragraph, after "establishing" insert -- permanent electrical contact, or for establishing --.

In the Claims:

✓
Please cancel claims 1-43 and insert the following:

Sub 1 Cont A
A3 con x
44. An attachment member for use with a semiconductor integrated circuit die, for establishing ohmic connections with contact points on the die, comprising:

a) a plurality of contacts to establish electrical communication with contact locations on the die;

b) the contacts being positioned so that the contacts may be placed into alignment with contact locations on the die and extending to the contact locations; and

c) the contacts being formed with at least one raised portion, the raised portion extending sufficiently that it may penetrate its respective contact location on the die, thereby establishing electrical communication with said contact location, said extension of the raised portion being limited so that, when a force is applied to the raised portion is significantly less than

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A3 cont.
~~a force required for portions of the contacts outside of the raised portion to penetrate its respective contact location, thereby limiting penetration depth of the contacts at the contact location. Δ~~

b Sub. C1 cont.
 Δ 45. ^{AN}~~A~~ attachment member for use with a semiconductor integrated circuit die as described in claim 44, further comprising:

said one raised portion extending so as to penetrate to less than $2/3$ of a thickness of its respective contact location on the die. Δ

b Δ 46. ^{AN}~~A~~ attachment member for use with a semiconductor integrated circuit die as described in claim 44, further comprising:

said one raised portion extending so as to penetrate to less than $1/2$ of a thickness of its respective contact location on the die. Δ

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A3
cont.
sub.
C#
concl.
AN
A 47. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 44, further comprising:

said one raised portion extending so as to penetrate to less than 2/3 of a thickness of its respective contact location on the die and said one raised portion extending at least 5000Å. *VA*

b
sub.
EE
A 48. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 44, further comprising:

the plurality of contacts being formed of semiconductor material by semiconductor circuit fabrication techniques. *VA*

b
A 49. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 48, further comprising:

b
the plurality of contacts being formed of a structure which includes silicon material, and the ^{Contacts}_{circuit traces} being formed on the silicon material by semiconductor fabrication techniques. *VA*

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AN
A3 cont.
450. ~~A~~₁ attachment member for use with a semiconductor integrated circuit die as described in claim 44, further comprising:

C
a pad which is electrically conductive in a Z-axis, normal to a plane of the pad, and which provides electrical isolation across the plane of the pad, the pad being positioned between the die and the plurality of contacts. ~~A~~

Sub. Cont.
451. An attachment member for discrete testing apparatus for testing a semiconductor integrated circuit device in die form, comprising:

a) a plurality of contacts to establish electrical communication with contact locations on the die;

b) circuit traces extending to said contacts;

c) the plurality of contacts being positioned so that the contacts are in alignment with contact locations on the die and extending to the contact locations; and

d) the plurality of contacts being formed with at least one raised portion, the raised portion extending sufficiently that it

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A3 cont.
~~may penetrate its respective contact location on the die, thereby~~
establishing electrical communication with said contact location,
said extension of the raised portion being limited so that, when a
force is applied to the raised portion is significantly less than
a force required for portions of the contacts outside of the raised
portion to penetrate its respective contact location, thereby
establishing ohmic connections with contact points on the die while
sub ca cont.
limiting the penetration of the contacts into the die at the
contact locations of the die. ~~4A~~

A_N
~~4A~~ 52. ~~A_N~~ attachment member for use with a semiconductor
integrated circuit die as described in claim 51, further
comprising:

said one raised portion extending so as to penetrate to less
than 2/3 of a thickness of its respective contact location on the
die. ~~4A~~

b
~~4A~~ 53. ~~A_N~~ attachment member for use with a semiconductor
integrated circuit die as described in claim 51, further
comprising:

~~said one raised portion extending so as to penetrate to less~~

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A3 cont.
~~than 1/2 of a thickness of its respective contact location on the die. *A*~~

b
Sub
Ca
concl.
A_N
A 54. *A* attachment member for use with a semiconductor integrated circuit die as described in claim 51, further comprising:

~~said one raised portion extending so as to penetrate to less than 2/3 of a thickness of its respective contact location on the die and said one raised portion extending at least 5000A. *A*~~

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A 55. *A_N* attachment member for use with a semiconductor integrated circuit die as described in claim 51, further comprising:

F
the plurality of contacts being formed of semiconductor material by semiconductor circuit fabrication techniques. *A*

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A3
cont.
A 56. ^{AN}~~A~~ attachment member for use with a semiconductor integrated circuit die as described in claim 55, further comprising:

F
the plurality of contacts being formed of a structure which includes silicon material, and the circuit traces being formed on the silicon material by semiconductor fabrication techniques. ~~A~~

b
A 57. ^{AN}~~A~~ attachment member for use with a semiconductor integrated circuit die as described in claim 51, further comprising:

a pad which is electrically conductive in a Z-axis, normal to a plane of the pad, and which provides electrical isolation across the plane of the pad, the pad being positioned between the die and the plurality of contacts. ~~A~~

A 58. An attachment member for use with a semiconductor integrated circuit die, for establishing ohmic connections with contact points on the die, comprising:

a) a substrate;

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A3
cont.
b) a die attachment surface on the substrate, the die attachment surface having a plurality of circuit traces extending therefrom, the circuit traces extending to contacts to establish electrical communication with contact locations on the die;

c) the contacts being positioned so that, when the die is positioned against the substrate with the contact points on the die facing the die attachment surface, the contacts are in alignment with contact locations on the die and extending to the contact locations; and

d) the contacts being formed with at least one raised portion, the raised portion extending sufficiently that it may penetrate its respective contact location on the die, thereby establishing electrical communication with said contact location, said extension of the raised portion being limited so that, when a force is applied to the raised portion is significantly less than a force required for portions of the contacts outside of the raised portion to penetrate its respective contact location, thereby limiting penetration depth of the contacts at the contact location. ~~BA~~

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A3
cont.
A 59. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

said one raised portion extending so as to penetrate to less than $\frac{2}{3}$ of a thickness of its respective contact location on the die. A

b
A 60. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

said one raised portion extending so as to penetrate to less than $\frac{1}{2}$ of a thickness of its respective contact location on the die. A

b
A 61. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

said one raised portion extending so as to penetrate to less than $\frac{2}{3}$ of a thickness of its respective contact location on the die and said one raised portion extending at least 5000A. A

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b
A3
cont.
62. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

the die attachment surface being formed of semiconductor material, and the circuit traces being formed on the semiconductor material by semiconductor circuit fabrication techniques. A

b
63. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 62, further comprising:

the die attachment surface being of a thickness sufficient to be substantially rigid. A

b
64. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 62, further comprising:

the die attachment surface being sufficiently thin to be partially flexible. A

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b
A3
cont.
65. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 62, further comprising:

the die attachment surface being formed of a structure which includes silicon material, and the circuit traces being formed on the silicon material by semiconductor fabrication techniques. 64

b
66. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 65, further comprising:

the die attachment surface being of a thickness sufficient to be substantially rigid. 64

b
67. ^{AN}_{A1} attachment member for use with a semiconductor integrated circuit die as described in claim 65, further comprising:

the die attachment surface being sufficiently thin to be partially flexible. 64

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b
A3
cont.
68. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

the die attachment surface being formed of a ceramic insulator, and the circuit traces being formed on a surface of the substrate. 69

b
69. ^{AN}_A attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

a) the die attachment surface being formed of a ceramic insulator, and the circuit traces being formed on a surface of the substrate; and

b) the die attachment surface being sufficiently thin to be partially flexible. 69

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b
A3 cont.
A 70. ~~A~~^{AN} attachment member for use with a semiconductor integrated circuit die as described in claim 58, further comprising:

a pad which is electrically conductive in a Z-axis, normal to a plane of the pad, and which provides electrical isolation across the plane of the pad, the pad being positioned between the die and the die attachment surface. ~~A~~

A 71. A method for establishing ohmic contact between a die contact location and an attachment member, comprising:

a) providing an attachment member including a plurality of contacts, the contacts being positioned to align with contact locations on the die, and the contacts being formed with at least one raised portion, the raised portion extending sufficiently that it may penetrate its respective contact location on the die, thereby establishing electrical communication with said contact location, said extension of the raised portion being limited so that, when a force is applied to the raised portion is significantly less than a force required for portions of the contacts outside of the raised portion to penetrate its respective contact location, thereby limiting penetration depth of the contacts at the contact location; and